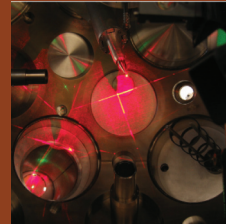


## The Trident facility

The Trident laser system consists of three high energy beams that can be delivered into two independent target experimental areas. The target areas are equipped with an extensive suite of diagnostics for research in ultra-intense laser-matter interactions, dynamic material properties, and laser-plasma instabilities.

Several important discoveries and first observations have been made at Trident, including laser-accelerated MeV mono-energetic ions, nonlinear kinetic plasma waves, transition between kinetic and fluid nonlinear behavior, as well as other fundamental laser-matter interaction processes. Trident's unique long-pulse capabilities have enabled state-of-the-art innovations in laser-launched flyerplates, and other unique loading techniques for material dynamics research.

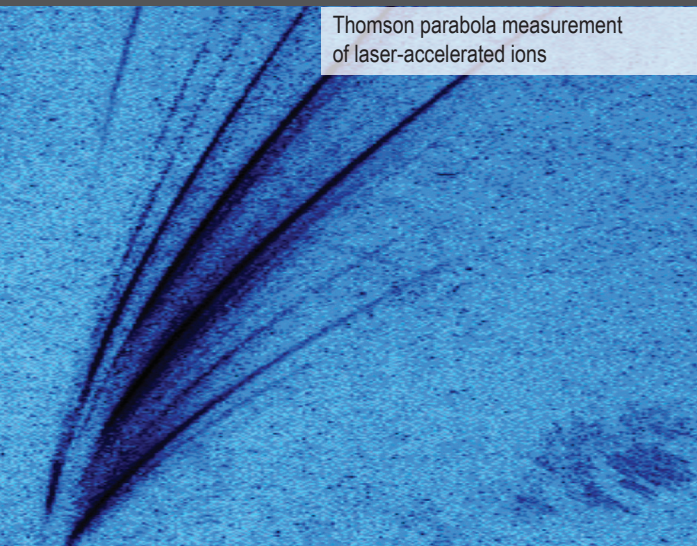


Molybdenum target during laser interaction (optical image)

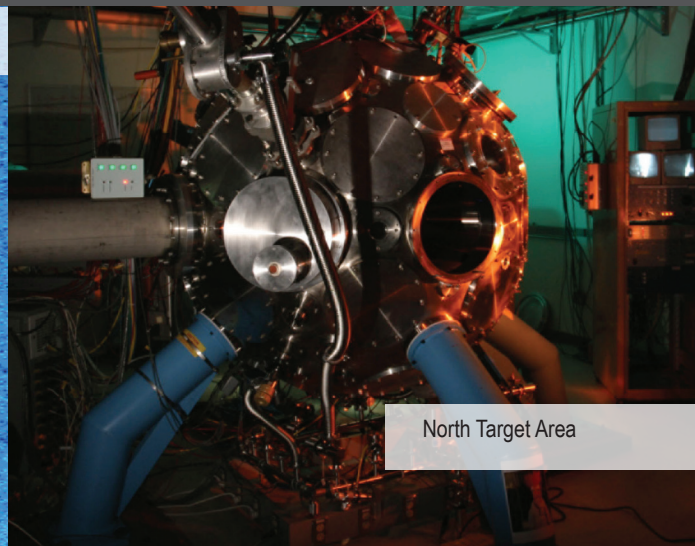
## Trident target chambers

Research can be performed in one of two target areas depending on laser and experimental requirements.

## Enabling world-class science in high energy density physics



Thomson parabola measurement of laser-accelerated ions



North Target Area

## Diagnostic suite

### MeV particles

- Thomson parabolas
- multilayer Radiochromic films
- CR-39 detectors

### X-ray

- TIM diagnostic manipulator
- streak cameras ( $< 10$  ps)
- gated imagers ( $< 50$  ps)
- crystal and grating spectrometers
- pinhole cameras and microscopes
- CCD cameras
- x-ray phase contrast imaging
- transient x-ray diffraction
- full darkroom services
  - » developing and scanning
  - » image plate scanning
  - » CR-39 etching and scanning

### Optical

- point and line-imaging VISARs
- transient imaging displacement interferometry (TIDI)
- pyrometry and ellipsometry
- streak cameras ( $< 10$  ps)
- imaging spectrometers
- CCD cameras
- short pulse auto-correlator
- $2\omega$ ,  $3\omega$ ,  $4\omega$  Thomson scattering
- backscatter diagnostics

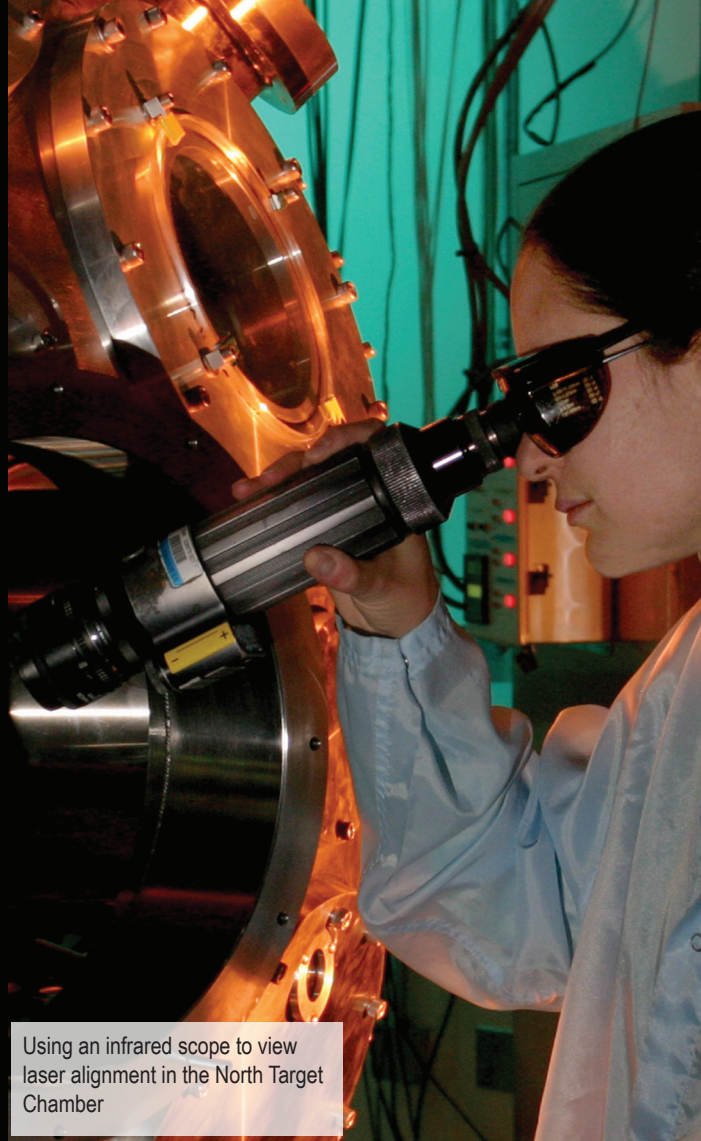
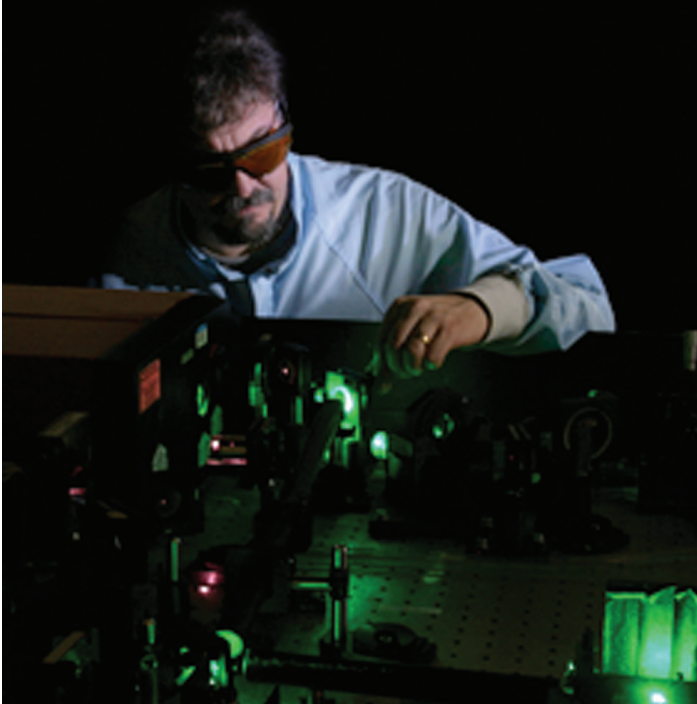


# Trident capabilities are well-suited to several key areas of HEDP research

**Ultra-intense fields**, novel accelerators, warm dense matter, laboratory astrophysics, fast-ignition science, collaboration with world-class modeling expertise.

**High-strain-rate dynamic material properties**, correlation of static and dynamic properties, actinide capabilities, full sample recovery.

**Fundamental laser-plasma interactions**, strongly-coupled plasmas, hands-on scientific training, diagnostic development, experimental staging to large facilities.



Using an infrared scope to view laser alignment in the North Target Chamber

LALP-08-063

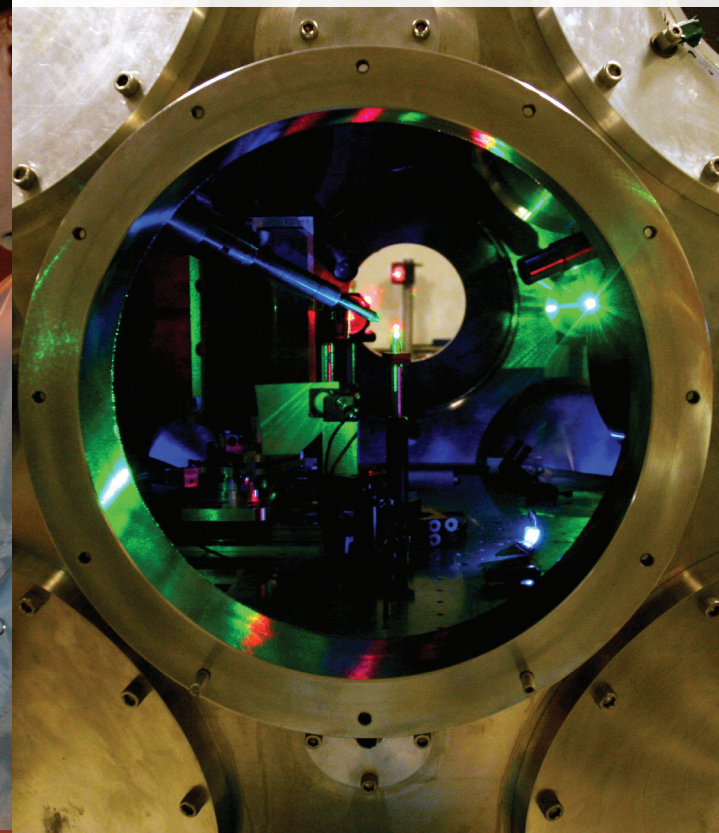
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# Trident

## Laser Facility



The Trident Laser Facility at Los Alamos National Laboratory is an extremely versatile Nd:glass laser system dedicated to high energy density physics research and fundamental laser-matter interactions.





